

Current River Bridge
Spanning the Current River on Route 160
Doniphan
Ripley County
Missouri

HAER No. MO-65

HAER
MO,
91- DONI,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Rocky Mountain Regional Office
National Park Service
U.S. Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

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MO,
91-DONI,

Current River Bridge

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1-

Location: Spanning the Current River on Route 160,
Doniphan, Ripley County, Missouri

UTM: A 15.4054400.693160
B 15.4054580.693420
Quad: Doniphan South, 1980

Date of Construction: 1926-1928

Present Owner: Missouri Highway and Transportation Department

Present Use: Vehicular bridge, to be removed and replaced by a new vehicular bridge.
Projected date of removal is spring 1991.

Significance: The Current River Bridge is a multi-span concrete-and-steel bridge consisting of three Parker through trusses and twenty-five concrete deck girder spans. Comprised of elements built from Missouri Highway department standard designs, the bridge, when completed, was distinguished as one of the longest bridges on the state highway system, and is a well-preserved example of standardized elements in bridge construction during the formative era of the Missouri State Highway Department.

Historians: David C. Austin
Design Division
Missouri Highway and Transportation Department
Jefferson City, Missouri

I. HISTORY

A. Need for the Bridge

Doniphan, in central Ripley County, Missouri, was founded in 1847 as the new county seat, following the reformation of county boundaries in 1841 and 1845. The town was located where the Missouri Territorial Road from Potosi, Missouri, to Little Rock, Arkansas, forded the Current River. [1] The growth of Doniphan was slow in the antebellum years. During the Civil War, Union and Confederate forces battled intermittently for control of Doniphan Ford, culminating in the description of Doniphan in September 1864. [2] Normalcy gradually returned during the post-war years as Doniphan was rebuilt. Among the new improvements was the town's first ferry crossing, established in 1867, about one-half mile south of the present bridge. Doniphan's population remained small until after 1883 when the St. Louis, Iron Mountain, and Southern Railroad constructed a branch line from Neelyville, Missouri, to Doniphan. The railroad changed the face of Doniphan and Ripley County, as vast tracts of virgin timber were opened for exploitation. [3]

Over the next twenty years, numerous lumber mills were set up in Doniphan and across the county, and the population mushroomed. Its position at the railhead gave Doniphan a huge impetus, as enormous rafts of logs and cut ties were floated down the Current River to be shipped east on the railroad. As the town expanded throughout the 1890s, new services and businesses appeared, such as a new school and courthouse, the county's first bank, a steam flour mill, and city water works, and the first bridge over the Current River. [4]

In early 1898, a local campaign began for the construction of a bridge over the Current River. Ten thousand dollars was soon raised, half from donations and half from revenue bonds. The bid for the bridge was let in June 1898 to St. Louis Bridge and Iron Company for \$7,870. Completed in November, the bridge linked Doniphan with its newer sister community of West Doniphan, then a small assortment of lumbermen's dwellings on the river's west bank. The bridge was located eighty feet north of the present structure. It consisted of two 225-foot steel high truss spans with a wooden floor, supported by six steel tubes filled with concrete. A 1,097-foot-long wooden trestlework extended across the east floodplain toward Doniphan. West Doniphan was platted the following year, and residences, stores and churches were soon established. By 1925, the unincorporated village had a population of around 150 persons. [5]

The Current River Bridge was planned and constructed under the auspices of the Missouri State Highway Commission in the late 1920s. The Commission was first formed in 1917, four years after the creation of the State Highway Department. The new Commission had the responsibility of selecting and designating inter-county state roads. A \$60 million bond issue, which passed in 1920, and the Centennial Road Law of 1921 effectively shifted more of the responsibilities of road construction from the county to the state level. [6]

One inter-county state road designated by the highway commission was State Route 42, which ran west from Poplar Bluff, through Doniphan, to Alton, thus connecting Ripley County with neighboring Butler and Oregon counties. One link in Route 42 was the 1898 Current River Bridge. As sections of Route 42 were improved, the need for a new Current River bridge became clear. Repairs and maintenance on the bridge and approaches over a three year period, which involved replacing the timber flooring and supporting stringers, became increasingly uneconomical. The weight limit was reduced from seven to four tons. In a February 1926 meeting, the Highway Commission

authorized Chief Engineer B. H. Piepmeier to proceed with construction of a new Current River Bridge. [7]

Piepmeier had the general plans nearly finalized by the time of the commission meeting. The plans had been drawn up under the supervision of Frank B. Newton, the Division Engineer of Division No. 10, Sikeston. [8] The project included a one-mile stretch of new highway leading to the bridge from the east which would relocate Route 42 to the west of Doniphan, bypassing the business district. While work proceeded on the design of the bridge and highway relocation from March through late May 1926, Newton made efforts to secure the necessary right of way. [9]

Although the citizens of Doniphan supported the need for a new bridge, they resisted the high relocation. J. C. Campbell, editor of the Prospect-News, unceasingly complained of the commission's "riotous spending in building expensive roads around the country just in order to miss towns, like it is doing right here at Doniphan." [10] Opposition to the proposed relocation hampered acquisition of the right of way, causing Piepmeier to write to Campbell and E. C. White, editor of the Doniphan Republican. Piepmeier's letter, which White published, explained that the plans for the bridge included a road connection leading into Doniphan, and urged the cooperation of Doniphan's citizens, so that work could begin as soon as possible. [11] In a reply to Piepmeier, White responded positively, saying that most residents favored the new location of the highway west of town. [12] In publishing Piepmeier's letter, however, White complained of the lack of progress on Ripley County roads:

About ten miles of highway is what Ripley County has got out of the bond issue, so it seems to the people of Ripley County that what is needed is some cooperation on the part of the Highway Commission. [13]

Newton arrived in Doniphan with the final plans on June 4, and they were publicly displayed at Johnston's Pharmacy. In mid-June, L. J. Sverdup, Assistant to the Chief Engineer, advertised for bids for a June 30 letting. [14] By June 22, the right of way had been secured from four of the six landowners involved. Eventually this would be paid for out of the refund money due to the Doniphan Special Road District. [15] On July 1, 1926, the bridge construction contract was awarded to the J. C. Elois Construction Company of Rockport, Indiana. The Richland Construction Company of Advance, Missouri, received the contract for the new highway relocation. [16]

B. Construction Chronology

Actual construction of the Current River Bridge began on August 11, 1925. By mid-October, Richland Construction had practically completed the dirt fill work at the far eastern approach. [17] Work proceeded rapidly at the west end of the bridge, so that by November 3, Bent Nos. 1 and 2 and Pier No. 3 were completed, and the forms were in place for the concrete for the two western girder spans. The rise of the Current River suspended work on Pier Nos. 4 and 5, which had been undergoing excavation, so work shifted to Bent Nos. 14, 15 and 16 on the east floodplain, where difficulties were encountered in driving the foundation piles. [18]

Through November 1926, little progress was made. Bent Nos. 14 and 15 were completed, and footings were poured for Bent No. 16 and Pier No. 17. Work on the bents east of Pier No. 17 was very slow because the gravelly soils were difficult to penetrate in driving the foundation pile, and continual water seepage delayed the pouring of the concrete. [19]

Through December and January, high water halted all work on the river piers. A record rainfall of 8.68 inches over a seven day period in late January further slowed the work on the eastern bents. A sharp letter to Ellis from the new Chief Engineer, T. H. Cutler, criticized the contractor's lack of progress and threatened to call on the bonding company to finish the project. [20] Meanwhile, Ellis had sublet the construction of the three steel through truss spans to the Vincennes Bridge Company of Vincennes, Indiana. [21]

By mid-March 1927, eight central bents along the eastern approach, Bent Nos. 13 to 20, had been completed. The girder spans over Bent Nos. 18 to 20 were underway. The easternmost Bent No. 29 was being pushed to completion, so that fill and riprap could be placed, connecting it with the eastern fill approach. With the completion of Pier No. 4, initial work on the westernmost truss span was anticipated, although continued high water plagued the completion of Pier No. 5. [22]

The Vincennes Bridge Company began shipping the steel to the bridge site in late March 1927. [23] Bridge Inspector DeWitt C. Wolfe noted that many of the lug angles and plates were bent. Approximately 25% of the rivets were pitted or malformed, and some of the stringers and chords were bowed. Meanwhile, high water continued to halt construction on the river piers, damaged the gravel plant, and delayed the procurement of sand needed for the bent footings. Work on the eastern bents proceeded slowly westward from bent No. 29, and from Bent No. 12. [24]

Over 13 inches of rain fell during the month of April. On April 15 and 16, the Current River rose to a flood stage of 17.6 feet, covering the eastern floodplain to within 75 yards of the court house, and halting traffic on Route 42. Due to the high water, the local gravel company supplying the sand could not meet the demand. When more sand was ordered and shipped in, the railroad hauling the sand confiscated the shipment to use on its own flooded railbeds. [25] By mid-May, excavation on Pier No. 6 had begun, with work on Pier No. 5 shut down. Bent Nos. 10 and 11 were completed. All the structural steel had arrived. However, the erection crew, under foreman E. T. O'Connor, were completing another job in Idaho. [26]

Additional rains around June 1 brought the river level up to 16 feet, but as the summer wore on, the water receded and construction progressed more rapidly. The Richland Construction Company sub-contracted for the western and eastern fill approaches, completing the western approach in late July. Four sets of girder forms were used to allow a quick completion of the eastern girder spans at a rate of two per week. By mid-July, Span Nos. 12 through 19 were finished. The concrete footings for Pier No. 6 had been poured despite water seepage in the cofferdam. Span No. 3, the western truss span, was erected, bolted, and the floor system riveted, after which the steel crew left for other jobs while they awaited completion of Pier Nos. 5 and 6. By July 28, the original estimated date of project completion, only 45% of the work was finished. [27]

September brought additional high waters, which again closed the gravel plant and limited the supply of concrete. Excavations for Pier No. 5 had filled with water, and further work on the truss spans was still suspended, pending completion of the river piers. Nevertheless, additional girder spans and bents were finished, Pier No. 6 was above water, and Span No. 3 was riveted and painted. By this time, approximately half of the project was completed. [28] Four bents, six girder spans, Pier Nos. 5 and 6, the remaining two truss spans, and the detail work on the approach fills remained unfinished. [29]

Most of the substructure work was finished by the middle of October 1927, except Bent Nos. 8, 21 and 22. With the completion of the river piers, the erection of the two truss spans awaited the return

of the "steel gang" of the Vincennes Bridge Company. Ellis asked the company for additional experienced men to complete the trusses as quickly as possible, so that the floor could be poured before cold weather. [30] The Highway Department's Assistant Chief Engineer, L. J. Sverdup, emphasized the urgency of suggesting to F. R. Sargent, Vice President of Vincennes Bridge Company, a strategy designed to speed up the truss work and flooring before winter. the steel erection resumed in late October and continued through November. Although Sargent complied with Sverdup's suggestions, the company was handicapped by a shortage of experienced labor. [31] Having passed the extended completion date of November 28, Ellis was assessed liquidated damages for engineering and detour expenses. [32]

At year's end, the truss spans were erected, but needed further riveting. All but one of the concrete girders were finished, and most of the handrails were in place. Despite riprap of "above the average workmanship," January rains washed out portions of the eastern fill slopes. [33] Freezing rain also cracked the anchor bolt holes and coping on Pier No. 5, forcing a partial recasting of the concrete and the sealing of remaining cracks with molten sulphur. Winter weather delayed the pouring of the floor slabs on the truss spans until March 2, and postponed the final paint work. On March 5, the last of the concrete railings and curbs were poured. [34]

A semi-final inspection of the bridge was made on March 12, 1928, by Inspector Wolfe. All was finished but the final coats of paint. The floor slab on Span No. 5, needing further time to set, would await inspection until March 25. Wolfe found two places on other sections of the bridge floor which were sub-standard and which were subsequently "rubbed down." [35] Otherwise, "the roadwork was in first class condition." [36]

The bridge was opened to traffic on Saturday, March 21, 1928. A waiting line of eight cars crossed the new bridge at 3:35 Saturday afternoon. The first car, "loaded with a bunch of high school girls," was driven by Miss Alma Fritsch of Doniphan. [37] A truck loaded with cross ties, driven by Ed Cox, another area resident, was the first vehicle over the west side of the bridge. [38]

The final inspection, made on April 23 after the painting was finished, found only an excessive coat of paint on the south batter post coverplates. [39] Chief Engineer Cutler accepted completion of the contract on May 1, 1928. [40]

Meanwhile, the people of Doniphan planned a formal dedication ceremony to celebrate the new bridge. A public meeting held by the Chamber of Commerce in the high school auditorium on April 12 drew poor attendance. The dedication was set for Tuesday, May 22, and various committees were formed which worked over the next few weeks planning the dedication agenda. [41] Monday, May 21, brought heavy rains that continued into Tuesday morning and forced a revision of the scheduled program, which took place in the high school auditorium rather than at the bridge. The American Legion Band of Poplar Bluff, followed by various groups depicting stages of the area's history and floats displaying Ripley County industries, marched through a light drizzle around the court house square and back to the auditorium. Invited speakers praised the new bridge as one of the longest spans in Missouri, and touted its anticipated boon to industry and tourism. Speakers included C. D. Mathews of Sikeston, Chairman of the State Highway Commission; Chief Engineer T. H. Cutler; State Senator Dwight Brown of Poplar Bluff; C. L. Harrison, President of the Cape Girardeau Bridge Company; and A. A. Burford, Secretary of the Ozarks Chamber of Commerce. Following the speeches, dinner was served at the Presbyterian Church. [42]

State Route 42 was redesignated State Route 14 in the 1940s and, in 1954, was again redesignated as U.S. Route 160. In 1967, a portion of the highway was realigned westward from the bridge's west approach. The Current River Bridge also serves as a part of state routes 21 and 142.

II. BRIDGE DESCRIPTION

The Current River Bridge, designated by the Missouri Highway and Transportation Department's Bridge Division as Bridge No. H-308, consists of two clear-span concrete deck girders at the west end, measuring 33 feet and 32 feet 6 inches; three standard S-8150 riveted Parker through truss spans, each approximately 152 feet in length; and twenty-three 42-foot, 6-inch clear-span concrete deck girders forming the eastern approach. The total length of the bridge is 1,493 feet. It has a 20-foot roadway. Bents, piers, and spans are numbered consecutively from west to east. [43]

Open End Bent Nos. 1 and 29, comprising the west and east ends of the structure, consist of reinforced concrete tapered columns with horizontal girders and tapered wings, set on reinforced concrete footings. Bent No. 1 is set in bedrock, while Bent No. 29 rests on timber pilings 35 feet in length. The two columns of Bent No. 1 are 11 feet 6 inches high. The columns of Bent No. 29 are 31 feet 2 inches high, with correspondingly larger basal dimensions and footings than Bent No. 1. The horizontal girders of both bents are 17 feet 3 inches in length and 2 feet wide. The lower girder-and-column connecting joints taper down and out.

Intermediate Bent No. 2 is of similar design, although the columns are not tapered and lack the wings of the end bents. Bent No. 2 is also set in bedrock, 33 feet east of Bent No. 1. The three-foot square-sided columns are 18 feet 7 inches high. The horizontal girder dimensions are equal to those of Bent No. 1.

Pier Nos. 3 through 6 are also built of reinforced concrete (see HAER Photograph No. MO-65-2). Pier No. 3 is 33 feet 2 inches from Bent No. 2. The remaining piers are spaced at 151-foot intervals. Pier Nos. 3 and 4 are set in bedrock, while Pier Nos. 5 and 6 are on 25-foot-long timber pilings. The piers each consist of two reinforced concrete, tapered cylindrical columns on concrete footings, connected with reinforced concrete web walls. They are topped with concrete caps. The columns measure approximately 8 feet 6 inches at the base, and taper to a diameter of 5 feet. The centers of the columns are 22 feet 4 inches apart.

Bent Nos. 7 through 16 and 18 through 28 are essentially identical in design, except for slight variations in the dimensions (see HAER Photograph No. MO-65-8). (Pier No. 17, discussed below, is of a different configuration.) The bents rest on foundations of timber pilings which are 35 feet long, except for the pilings of Bent Nos. 7 and 8 which are 25 feet and 30 feet long, respectively. The reinforced concrete footings measure 8 feet 3 inches long, 6 feet wide, and 3 feet thick. Each bent has two reinforced concrete columns which range in height from 45 feet 11-1/2 inches for Bent No. 7 to 33 feet 1/4 inch for Bent No. 28. The columns are 3 feet long and 2 feet 3 inches wide, and are reinforced with a two-foot-wide center tie beam of reinforced concrete. The centers of the columns are spaced 13 feet 8 inches apart. The upper horizontal girders are 3 feet wide at the top.

Reinforced concrete deck girders extending from Pier No. 6 to End Bent No. 29 are 39 feet 6 inches long from the outer edges of each bent, or 42 feet 6 inches long from the center of each bent (see HAER Photographs No. MO-65-8 and MO-65-9). The girders are 2 feet 7 inches thick and 2 feet wide. Concrete web walls between the girders, plus outer brackets, occur at each bent and midway between each bent.

The two western girder spans are 29 feet 6 inches long from the bents' outer edges. They are 2 feet 4 inches thick and 1 foot 5 inches wide (see HAER Photographs MO-65-2 and MO-65-3).

The bridge floor, also built of reinforced concrete, is 9-1/2 inches thick and 23 feet wide. There are 3/4-inch expansion joints at each bent, and a 3-1/2-inch expansion joint at Pier No. 17. The outer edges of the deck girder spans support concrete curbs and rails, which were poured separately from the girders and floor (see HAER Photographs No. MO-65-3 and MO-65-7).

The curbs are 1 foot 6 inches wide at the base, and rise 10 inches above the floor, with an inch wide bevel. Five-foot-long drainage holes are spaced at 5-foot intervals. The rails include end posts at each bent, which are 2 feet 6 inches by 1 foot 6 inches at the base, are beveled to a center width of one foot, and have a 15-inch-wide cap beveled to a width of 9 inches at the top. The rail base is 7 inches high with an inch bevel. Sixteen-inch-wide subposts are spaced at 8 feet 8-3/4 inch intervals. Twelve 4 by 4 inch balusters, each 20 inches long, are evenly spaced between the subposts. The beveled rail top is 6 inches thick, and is 3 feet 7 inches above the bridge floor (see HAER Photographs No. MO-65-3 and MO-65-7).

The three Parker through truss spans are built from standard plans designed by the Missouri State Highway department. [44] The truss design number is S-8150 (see HAER Photograph No. MO-65-1). Each of the three spans consist of eight panels which are 18 feet 9 inches in length, for a total span of 150 feet. Span members are connected with 3/4-inch diameter rivets.

Riveted bent plates are attached to the piers' rockers and flat bearing plates with 4-1/2-inch diameter pins. The end panels consist of inclined batter posts with outer cover plates and inner lacing bars; 20-foot-long hip posts with lacing bars; and lateral portal beams. Lower chord members are reinforced with batten plates and are riveted to the vertical posts with lateral plates and gusset plates (see HAER Photographs No. MO-65-2, MO-65-3, MO-65-4, and MO-65-5).

Interior posts have reinforcing lacing bars, a central sway plate, and upper and lower web plates. The interior posts measure 22 feet 9 inches, 24 feet 5 inches, and 25 feet. Diagonal members between the interior posts have reinforcing stay plates. Upper chords have outer cover plates and inner lacing bars. The interior posts' upper ends are connected to sway braces, which consist of two lateral beams with diagonal cross-members attached to gusset plates. Crossing top laterals further brace the interior posts (see HAER Photographs No. MO-65-2 and MO-65-5).

Floor I-beams, 2 feet 1 inch wide, are connected to the lower chord and vertical post junctions with riveted lateral plates and U-bolts. Eight I-beam stringers are spaced between the floor beams at intervals of 2 feet 8-1/2 inches. Bottom lateral braces underneath the stringers are connected at the ends of the floor beams (see HAER Photograph No. MO-65-5).

The floor of the truss spans is of reinforced concrete. It has a 10-inch-high concrete curb with drainage holes, metal rail posts, and metal rails.

III. CONSTRUCTION CONTRACTORS

A. J. C. Ellis Construction Company

The J. C. Ellis Construction Company was based in Rockport, Spencer County, Indiana. Unfortunately, no information on this company is available. However, the following biographical information was obtained on James Clinton Ellis, head of the construction company.

Ellis was born in Spencer County in 1874 and eventually became a self-made millionaire. Ellis started a lumber company in the early 1900s, expanded into farm real estate in 1910 and, after 1914, became a partner in several construction companies which built roads and bridges across the United States. He also developed a horse and mule trading business which became a nationwide operation. In 1926, Ellis entered the oil business, where he made the bulk of his fortune. In addition to these varied enterprises, Ellis owned a ferry, transfer company, funeral home, laundry, grain company, coal mine, vacation camp, tire recapping firm, bank, race track, racing stables, and thoroughbred horses. "I always did pretty well at anything I ever tackled," Ellis said. [45] In his later years, Ellis maintained an office in Owensboro, Daviess County, Kentucky. He died on March 2, 1956. [46]

B. Vincennes Bridge Company

The Vincennes Bridge Company of Vincennes, Indiana, provided the design details, and manufactured and erected the structural steel for the three Parker through truss spans of the Current River Bridge, having sublet this portion of the contract from J. C. Ellis.

The Vincennes Bridge Company was founded in 1899 by brothers John and Frank Oliphant, and Jacob Riddle. John Oliphant, a former hardware merchant and real estate agent, had served briefly as vice president and secretary of the New Castle Bridge Company, before leaving the firm to found his own bridge company. His brother, Frank, was a school teacher and school principal before joining the company. The third founding member, Jacob Riddle, was a merchant from Cincinnati. [47]

The Vincennes Bridge Company began with a capital stock of \$20,000. Benjamin F. Nesbit was the first chief engineer. In 1902, the capital stock was increased to \$50,000. The firm continued to prosper, so that by 1911 it was manufacturing around 1,200 spans annually. The company had constructed bridges in eight midwestern and southern states by 1920. The company designed standard, undecorated truss bridges, with an emphasis on function and economy. They also fabricated the steel and erected the spans. During the 1920s, the company actively pursued bridge building contracts for the Indiana State Highway Department, as well as other state highway departments, gaining a significant share of this market. [48]

The Vincennes Bridge Company made a significant contribution to Indiana's bridges. They may have built more of the state's Parker trusses than any other Indiana firm, including a Parker truss built in 1924 over the Kankakee River, the state's longest extant Parker truss. [49] In their design of Pratt trusses, they experimented with pulling the floor beams above the lower chords in both riveted and pinned spans. In 1925, the Vincennes Bridge Company won a contract to build ten Pratt trusses along Indiana's highways. [50] Pennsylvania trusses built by the company include a 1913 403-foot two-span over the East Fork of the White River, and one over the West Fork of the White River, built in 1914. The latter bridge was the longest Pennsylvania span in Indiana, with an extra two-panel section on each side. [51] The company's designs also contributed to the final patterns of Warren trusses. The

company manufactured a number of Warren pony trusses for the Indiana Highway Department along U.S. Route 30. [52]

In early 1927, when the Current River Bridge was under construction, the Vincennes Bridge Company's capital stock rose to \$750,000, making it the second largest metal fabricator in the state. At that time, Frank Oliphant was the company's president and general manager, John Oliphant was treasurer, Jacob Riddle was vice president, and F. R. Sargent was chief engineer. [53] Later in the year, Sargent became third vice president, along with Riddle and C. O. Free, and B. B. Johnston became chief engineer. [54]

Frank Oliphant left the company in 1932, and it was incorporated into the Vincennes Steel Corporation. The corporation was dissolved in 1951, after which the company was held as a subsidiary by other corporations. Today, it is an independent firm, operating under the name of Vincennes Steel Corporation. [55]

ENDNOTES

- 1 Jerry Ponder, The History of Ripley County, Missouri, no publisher, 1987, pp. 17-27.
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- 3 Ibid., pp. 60-77 passim.
- 4 Ibid., pp. 77-95 passim.
- 5 Jerry Ponder, "West Doniphan, Missouri," no publisher, 1989, no page; Missouri State Highway Department, (henceforth referred to as M.S.H.D.), Bridge No. H-308 File, Jefferson City: Bridge Division, Missouri Highway and Transportation Department, no date.
- 6 Missouri State Highway Commission, (henceforth referred to as M.S.H.C.), Roads and their Builders, Jefferson City: Division of Public Information, Missouri Highway and Transportation Department, no date, pp. 75-78.
- 7 M.S.H.C., Minutes of Proceedings, February 23, 1926, Jefferson City: Secretary's Office, Missouri State Highway Commission, 1919--; M.S.H.D., Bridge No. H-308 File, Inspection Report, August 13, 1926; Prospect-News, Doniphan, Missouri, April 1, 1926.
- 8 M.S.H.D., Bridge No. H-308 File, F. B. Newton to B. H. Piepmeier, February 11, 1926.
- 9 Ibid., L. J. Sverdup to F. B. Newton, March 11, 1926, B. H. Piepmeier to F. B. Newton, March 29, 1926, L. J. Sverdup to F. B. Newton, May 24, 1926.
- 10 Prospect-News, March 3, 1927.

- 11 M.S.H.D., Bridge No. H-308 File, F. B. Newton to B. H. Piepmeier, March 20, 1926; B. H. Piepmeier to E. C. White, May 6, 1926; B. H. Piepmeier to J. C. Campbell, May 6, 1926.
- 12 Ibid., E. C. White to B. H. Piepmeier, May 12, 1926.
- 13 Doniphan Republican, Doniphan, Missouri, May 11, 1926.
- 14 Ibid., June 8, 1926; M.S.H.D., Bridge No. H-308 File, L. J. Sverdup to F. B. Newton, June 4, 1926.
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- 19 Ibid., Inspection Report, December 7, 1926.
- 20 Ibid., T. H. Cutler to J. C. Ellis, February 8, 1927; J. C. Ellis to L. J. Sverdup, February 11, 1927; Doniphan Republican, January 27, 1927.
- 21 M.S.H.D., Bridge No. H-308 File, F. R. Sargent to Missouri State Highway Commission, January 3, 1927.
- 22 Ibid., Inspection Report, March 15, 1927.
- 23 Ibid., F. R. Sargent to L. J. Sverdup, March 31, 1927; Doniphan Republican, March 31, 1927.
- 24 M.S.H.D., Bridge No. H-308 File, Inspection report, April 5, 1927.
- 25 Ibid., Inspection Report, May 10-11, 1927; Prospect-News, April 21, 1927.
- 26 M.S.H.D., Bridge H-308 File, Inspection Report, May 10-11, 1927.
- 27 Ibid., Inspection report, July 6, 1927, Inspection Report, July 19, 1927, T. H. Cutler to J. C. Ellis, November 21, 1927; Doniphan Republican, June 2, 1927, July 28, 1927; Prospect-News, July 14, 1927.
- 28 M.S.H.D., Bridge No. H-308 File, Inspection Report, September 15-16, 1927.
- 29 Ibid., Inspection Report, September 28, 1927.
- 30 Ibid., Inspection Report, October 14, 1927.
- 31 Ibid., L. J. Sverdup to F. R. Sargent, November 1, 1927; F. R. Sargent to L. J. Sverdup, November 4, 1927.
- 32 Ibid., T. H. Cutler to J. C. Ellis, November 21, 1927.

- 33 Ibid., Inspection Report, January 10, 1928.
- 34 Ibid., Inspection Report, January 10, 1928; Inspection Report, February 8, 1928; Doniphan Republican, March 8, 1928.
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- 36 Ibid.
- 37 Prospect-News, April 5, 1928.
- 38 Ibid.
- 39 M.S.H.D., Bridge No. H-308 File, Inspection Report, April 23, 1928.
- 40 Ibid., R. Dunlap to L. J. Sverdup, May 1, 1928.
- 41 Prospect-News, April 12, 1928, April 19, 1928, May 10, 1928, May 17, 1928; Doniphan Republican, April 19, 1928, May 17, 1928.
- 42 Prospect-News, May 24, 1928; Doniphan Republican, May 24, 1928.
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- 46 Ibid., pp. 35-37.
- 47 James L. Cooper, Iron Monuments to Distant Posterity: Indiana's Metal Bridges, 1870-1930, Greencastle, Indiana, DePauw University, 1987, p. 28.
- 48 Ibid.
- 49 Ibid., p. 77.
- 50 Ibid., pp. 60, 145.
- 51 Ibid., p. 71.
- 52 Ibid., pp. 87, 175.
- 53 Ibid., p. 29; M.S.H.D., Bridge No. H-308 File, F. R. Sargent to Missouri State Highway Commission, January 3, 1927.

- 54 Ibid., F. R. Sargent to Missouri State Highway Commission, November 4, 1927.
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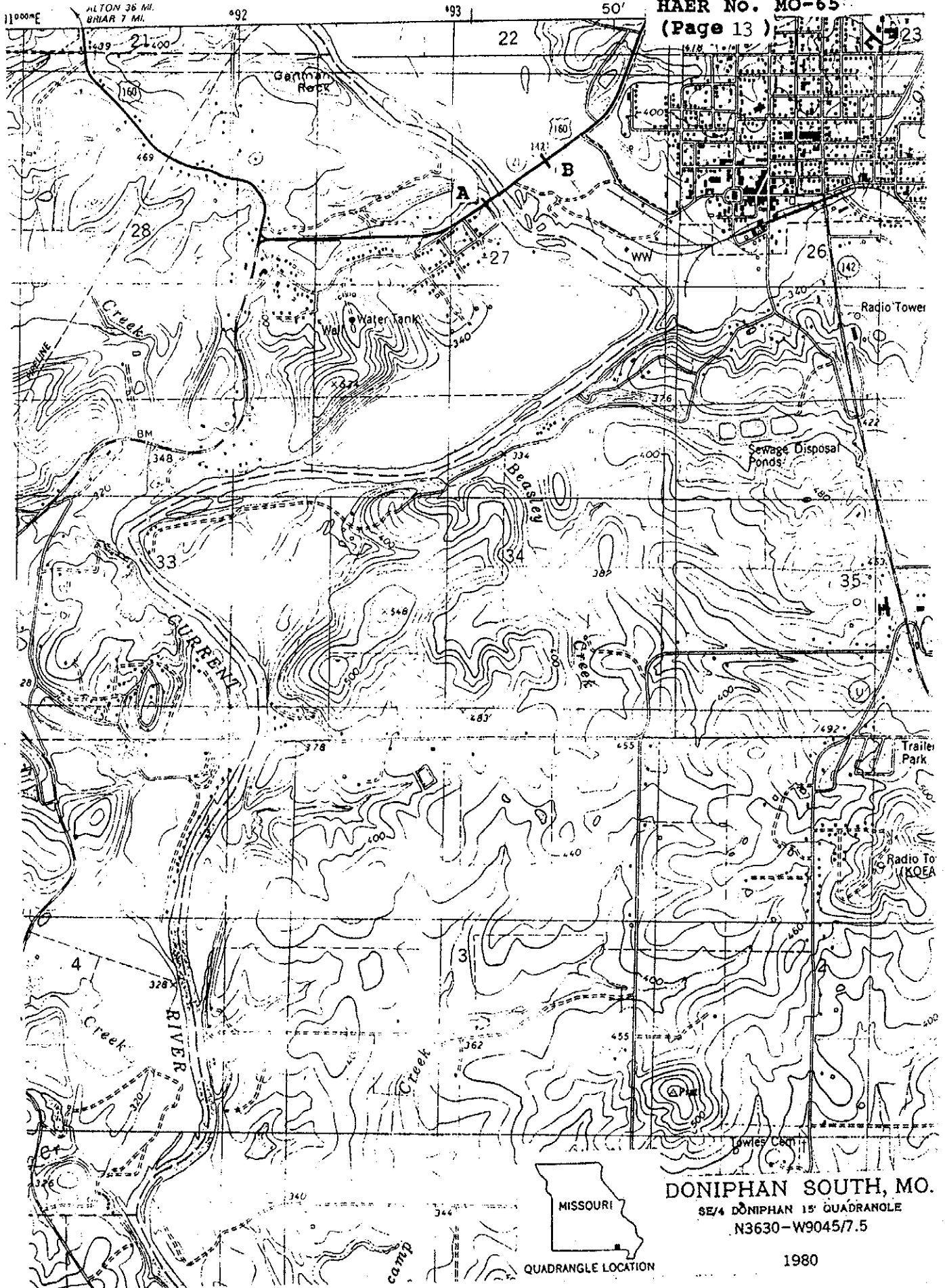
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DONIPHAN SOUTH, MO.
SE 1/4 DONIPHAN 15' QUADRANGLE
N3630-W9045/7.5

QUADRANGLE LOCATION

1980